

4.1 C-A Complex Access Control Procedures for Primary Beam Enclosures

1. Purpose

1.1 The purpose of this procedure is to instruct Shift Operations Personnel in the Collider-Accelerator Complex Access Control Procedures.

1.2 Definitions

Shift Operations Personnel(SOP): Include MCR Operations Coordinators (OC), MCR Operators (Operators), Collider-Accelerator Support Group (CAS).

Beam Enclosure States: Enclosures monitored by the Particle Accelerator Safety System (PASS). PASS used for U,V,W,X,Y and beam lines, RHIC may be in any one of five states; Safe Access(SA), Restricted Access (RA), Controlled Access (CA), No Access (NA); the state where beam is permitted, and experimenter Access (XA).

For the LINAC, AGS, Booster, and SEB, the conventional (relay logic) Access Control System (ACS) may be in either of two security states, Restricted Access (RA) or Controlled Access (CA).

Remote Controlled Access (RCA) like Controlled Access, workers are required to be counted by signing a log sheet when they enter and exit an enclosure. For conventional Controlled Access, the gate watch and log sheet are located at the gate to be entered. For RCA the gate watch and log sheet are located in the MCR. Under RCA, the gate watch may sign workers in and out of as many as three gates simultaneously.

AGS Token: is held by the gatewatch. It is either a Lab ID Card, RW-1 proof of training (Blue) Card, or the RCT Qualification Card.

PASS Token: is held by the entrant. It is the PASS CA key for the appropriate enclosure, obtained from the MCR. No other token is required.

2. Responsibilities

2.1 Shift Operations Personnel are responsible for implementing this procedure.

2.2 Shift Operations Personnel that stand gate watch shall fill out the required information on the "AGS GATE SECURITY" log sheet ([C-A-OPM-ATT 4.1.a](#))

2.3 Radiological Control Technicians are responsible for performing surveys of residual radiation levels and the extent of contamination, if any, in a primary beam enclosure prior to the start of work in the enclosure.

- 2.4 The OC is solely responsible for approving and initiating ready for beam state.
- 2.5 Persons entering beam enclosures are responsible to observe and obey radiological postings.
- 2.5.1 Persons entering a High Radiation Area are responsible for completing the "C-A RWP Access Control Log".

3. **Prerequisites**

- 3.1 Lockout Tagout shall precede any entry into the AGS or Booster rings (see References 7.4 and 7.5) except under the conditions noted in Reference 7.6.
- 3.2 Appropriate Key for un-resetting the primary area (see [C-A-OPM-ATT 4.1.c](#)).
- 3.3 "C-A Gate Security Log Sheet Form", [C-A-OPM-ATT 4.1.a](#) header lines one through four are filled out before an access.
- 3.4 Enclosure entrants shall have their Token Card, or PASS CA Key.
- 3.5 Except for FEB gate 2 and PASS RCA gates, only one gate may be entered in an enclosure at a time, while all others must remain closed, locked, and reset. More than one (1) un-reset (primary plus redundant) gate requires a full re-sweep of the enclosure.

4. **Precautions**

- 4.1 Procedure steps in **BOLD** type are critical steps and must be performed in sequence.
- 4.2 [C-A-OPM-ATT 4.1.a](#). "C-A Gate Security Log Sheet Form", is a two-sided form.
- 4.3 Cool down time, prior to entry to any area, shall be determined by particle species, and beam intensity injected into the AGS or Booster:
- 4.3.1 Wait 15 minutes before entering the LINAC.
- 4.3.2 Wait 30 minutes before entering a production target cave, or the BLIP Spur.
- 4.3.3 Wait Times for other areas:
- Protons - 30 minutes ($I_{\text{AGS}} > 5.0 \times 10^{12}$ ppp)
 - Protons/Polarized protons - 5 minutes ($I_{\text{AGS}} < 5.0 \times 10^{12}$ ppp)
 - Heavy Ions - 0 minutes ($I_{\text{AGS}} < 1.0 \times 10^{10}$ Ipp) (Includes W,X,Y, RHIC)

- 4.4 Controlled Access is not permitted using
- AGS HEBT Door (Into the LINAC)
 - AGS HEBT N322 Gate (Into the AGS)
 - Labyrinth Gate A (Booster into the AGS)
 - Labyrinth Gate B (AGS into the Booster)
- 4.4 No work on the Access Control System which would jeopardize personnel safety for a given area is permitted if that area is in use for Controlled Access.
- 4.5 [C-A-OPM 4.44 "Operation of PASS"](#) details the procedures used for Remote Controlled Access in BAF, RHIC, and the A3 SEB beam line.
- 4.6 [C-A-OPM-ATT 4.1.f "C-A Gate Security Log Sheet for Remote Access"](#) **MAY ONLY BE USED FOR GATES WHERE REMOTE KEY TREES ARE INSTALLED** (A3, BGE1). Persons accessing these gates will not sign in on the gate log sheet. Instead they will be identified by an IRIS scanner and by signed in and out by the Remote Controlled Access Operator in the MCR.

5. Procedure

- 5.1 Changing the state of a primary beam enclosure (Relay System).
- 5.1.1 Operator or CAS member changes the state of the C-A from Controlled Access to Restricted Access or vice versa by, inserting the H693 key into the keyswitch at MCR_2-1Y8 and simultaneously depress the pushbutton at MCR_2-1Y7
- 5.1.2 Operator or CAS member changes the state of the SEB primary beam enclosures from Controlled Access to Restricted Access or vice versa by, inserting the H693 key into the keyswitch at MCR_2-1Y8 and simultaneously depress the pushbutton at MCR_2-1(L/N/Q/S/U)2 depending on the "beamline"
- 5.1.3 Operator or CAS member changes the state of the Linac from Controlled Access to Restricted Access or vice versa by, inserting the BNL 3 key in the (CA/RA) keyswitch located on enclosure 4880 (building 930/Linac).
- 5.1.3.1 Turn the key
- 5.1.3.2 Press the CA/RA push button
- 5.1.3.3 Release the key
- 5.1.3.4 Release the push button

- 5.1.4 Operator or CAS member changes the state of the Booster from Controlled Access to Restricted Access or vice versa by, inserting the H693 key in the first (left) keyswitch at MCR_2-1J1 and press the pushbutton at MCR_2-1H1 for Restricted Access and at MCR_2-1H2 for Controlled Access.
- 5.1.5 Operator or CAS Technician changes the state of the PASS Monitored enclosures from Controlled Access to Restricted Access or vice versa.
 - 5.1.5.1 IF going from NA to CA, THEN turn critical devices off if they are not off.
 - 5.1.5.2 IF going from XA, or RA to CA, THEN close any door to that beam enclosure that is open.
 - 5.1.5.3 Press and hold the CA or RA or XA pushbutton for the affected area on the PanelView at MCR_2-3(4).
 - 5.1.5.4 Momentarily depress the "Mode Permit" Button above the PanelView at MCR_2-3(4).
 - 5.1.5.5 Release the CA or RA or XA pushbutton on the PanelView at MCR_2-3(4).

5.2 Controlled Access Gate Entry

5.2.1 Prior to entry

Note 1:
Observe and Comply with All Radiological Postings

- 5.2.1.1 OC asks an MCR Operator to "make safe" the enclosure by turning off the appropriate beam switch (see [C-A-OPM-ATT 4.1.b "Primary Beam Accessibility Matrix"](#)).
- 5.2.1.2 Allow time for cool down (paragraph 4.3).
- 5.2.1.3 Set the enclosure to Controlled Access (PASS enclosures).
 - 5.2.1.3.1 IF a RHIC interaction region is set to CA or XA, THEN the OC shall ensure that the experiment shift supervisor is notified of the mode change. If no experimenters are on shift, THEN the OC may proceed without making notification.

- 5.2.1.4** OC Direct Shift Operations Personnel to perform LOTO for electrical safety (AGS and Booster).
- 5.2.1.5** Shift Operations Personnel prior to entry, fill out the header (lines one through four) and line "1" on the [C-A Gate Security Log Sheet Form](#)" C-A OPM-ATT 4.1.a
- 5.2.1.6** Shift Operations Personnel insert the appropriate gate key ([C-A-OPM-ATT 4.1.c](#) "Keys Required to access Primary Beam Enclosures" and unreset the gate by turning the key while getting a "simultaneous" release from an operator in the MCR).
- 5.2.1.6.1** Ignore previous step (5.2.1.6 for PASS enclosures.
- 5.2.1.7** Establish the Gate Watch & REMAIN AT THE GATE AT ALL TIMES OR UNTIL FORMALLY RELIEVED.
- 5.2.1.8** Establish a barrier to control crowds so that access is made one person at a time.

Note 2:

A fixed barrier is not available at every gate.

- 5.2.1.9** For High Radiation Areas, admit a Radiological Control Technician (RCT) to measure residual levels at the job site(s) and along the route to the job site(s).

Note 3:

High Radiation Areas do not include the V1D6 Pit or Muon Storage Ring Bldg. 919 or V1 Line, or W,X,Y or RHIC

- 5.2.1.9.1** The first access into a primary beam enclosure following a machine evolution shall be to perform a radiological survey.
- 5.2.1.9.1.1** Waiver of the survey (Heavy Ion Operations, BAF Operations, or RHIC Operations) shall be approved in writing by the Chairman of the Radiation Safety Committee and the FSS Representative, or designee.

- 5.2.1.9.2 IF a small group (five or less) of persons is going to one location in the enclosure, THEN they may accompany the RCT only if the RCT precedes them to the destination.
- 5.2.1.9.3 After RCT approves entry, SOP permits access and maintains gate watch for a group of 6 or more.
- 5.2.1.10 Entrants to High Radiation Areas complete [C-A OPM-ATT 9.5.11.a](#) the “C-A RWP Access Control Log” for each entry.
- 5.2.1.11 Entrants to PASS enclosures shall go to MCR to sign out a CA Key.
 - 5.2.1.11.1 Persons who enter RHIC enclosures under Remote Controlled Access (**RCA**) conditions shall show their valid Pink and Blue RHIC (PASS) Restricted Access card to the operator signing out key in order to obtain a CA key. Positive identification of an individual by an IRIS scanner gives the RCA Operator the authority to release a key from a remote key tree at BAF or RHIC.
 - 5.2.1.11.2 An Operator shall have the entrant sign for a CA key using the [C-A-OPM-ATT 4.1.a C-A Gate Security Log Sheet](#) form. The Operator shall record the CA key number in the ID/CA# column on the form. At least one form will be used for each key tree from which a CA key was taken.

5.2.2 Making entries -- **GATE WATCH REQUIREMENTS**

5.2.2.1 **Require every entrant to fill out the C-A Security Gate Log Sheet AND collect Token Card.**

5.2.2.1.1 **Token Cards are NOT required for PASS enclosures. The entrant shall carry the token (CA key).**

5.2.2.1.2 **The gate watch shall write “*RW-1*” or “*ID*” or “*CA key#*” in the “ID /CA#” Column as appropriate on the [C-A Gate Security Log Sheet](#) form.**

5.2.2.1.2.1 **Entry into a PASS enclosure requires the Gate Watch to enter the key number (stamped on the key) in the ID/CA# column. The gate watch shall NOT write EB014, EB010, etc.**

5.2.2.1.3 The gate watch shall “initial in” each person who enters (WATCH INITIAL IN column) after they observe the entrant go through the gate.

5.2.2.2 Permit entrants to enter one at a time

5.2.2.2.1 In the AGS, Booster, and SEB, group leaders may use their individual AA256A keys to unlock the gate

5.2.2.2.2 In PASS enclosures the entrant shall possess a CA key and operate the key to open the door.

Note 4:

IF the gate was opened for four hours or if the number of entries equals 26 THEN a sweep or cursory sweep is indicated.

The gate watch informs the OC if a sweep is indicated and the OC shall decide when to sweep the enclosure.

5.2.2.3 As each worker exits the primary area they shall sign out on the gate log.

5.2.2.3.1 Gate Watch shall “initial out” each person who exits (WATCH INITIAL OUT column) AFTER they sign out and then return the persons Token card, if a card was taken.

5.2.2.3.2 IF an error occurs on the gate log during signout, THEN the gate watch stander and entrant shall correct the form, by rewriting the corrupted line.

5.2.2.3.3 Report to the OC any failures or possible failures to log in or log out.

5.2.2.3.4 Tell Entrants to PASS enclosures to return CA keys to MCR.

5.2.3 Relieving the Gate Watch

5.2.3.1 IF a gate is to be open for an hour or more, THEN the OC shall endeavor to relieve the Gate Watch stander hourly.

5.2.3.1.1 The OC shall approve who provides relief for the gate watch.

5.2.3.1.2 ONLY C-A Department personnel may be approved by the OC to act as gate watch relief.

- 5.2.3.2 Shift Operations Group members, trained in this procedure can assume the gate watch.
- 5.2.3.3 IF the person relieving the gate watch is not a member of the Shift Operations Group or has not been trained, THEN they must be trained in gate watch paragraph 5.2.2. (Gate Watch Procedure Training Record on back of "[C-A Gate Security Log Sheet](#)" form).
- 5.2.3.3.1 Training consists of step by step review of paragraphs 5.2.2 and 5.2.3 conducted by a member of the Shift Operations Group. The Shift Operations Group member shall sign the appropriate line on the back of the gate watch log stating that the person is trained.
- 5.2.3.3.2 Only Shift Operations Group members may act as trainers.
- 5.2.3.3.3 Gate Watch training for persons who are not members of the Shift Operations Group is valid for **ONE** day. They must be trained each time they assume gate watch duties.
- 5.2.3.3.4 ONLY CAS/MCR personnel may relieve other CAS/MCR personnel standing gate watch at MCR_7 during Remote Controlled Access (RCA).
- 5.2.3.4 Trained Gate Watch reliever shall:

Note 5:

The person standing gate watch may not leave the gate until relieved by a Shift Operations Person who will assume the gate watch, train a new gate watch, or reset the gate.

- 5.2.3.4.1 Sign in on the Gate Security Log Sheet.
- 5.2.3.4.2 Assume control of all Token cards under the control of the gate watch.
- 5.2.3.4.3 Conduct the gate watch according to paragraphs 5.2.2.
- 5.2.3.4.4 Not train a new gate watch if he/she (the gate watch stander) is not a member of the Shift Operations Group.

- 5.2.3.4.5 Not reset the gate if he/she (the gate watch stander) is not a member of the Shift Operations Group.
- 5.2.3.4.6 At the end of the gate watch tour, transfer control of Token cards to the relieving person.
- 5.2.3.4.7 Sign and initial out on the Gate Security Log Sheet.

5.2.4 After entries are completed -- GATE RESET by Shift Operations Personnel

5.2.4.1 Shift Operations Personnel (CAS/MCR = SOP) shall,

- 5.2.4.1.1 Verify that all entrants who signed in have signed out,
- 5.2.4.1.2 Verify that the gate watch has no Token cards other than their own.
- 5.2.4.1.3 RCA gates (PASS) are reset (remotely) in the MCR.
- 5.2.4.1.4 Reset the gate.
- 5.2.4.1.5 Contact MCR to verify they have a gate reset indication.
- 5.2.4.1.6 Insert but do not capture the Reset/Enable key (LINAC, AGS, Booster Switchyard) in the panel at MCR_2-1 or give the key to the O.C.

5.2.4.2 Gate Watch shows the OC that the C-A Gate Security Log Sheet indicates that all persons that entered the enclosure have been accounted for.

- 5.2.4.2.1 OCs shall perform an independent review of the log sheet and sign the sheet on the appropriate line.**
- 5.2.4.2.2 OC determines if a sweep is required and signs the log sheet on the appropriate line.**
- 5.2.4.2.3 OC resets the redundant reset where required.**

5.2.5 Gate Watch files the complete C-A Gate Security Log Sheet in the "Gate Security Log" three ring binder in the MCR.

5.3 Gate Entry **No Gate Watch (Does not apply to Booster Enclosure)**

5.3.1 Prior to entry

5.3.1.1 The OC shall instruct Shift Operations Personnel to perform LOTO, if LOTO is required for electrical safety (AGS/Booster).

5.3.1.2 Shift Operations Group member completes the header information and line one on the C-A Gate Security Log Sheet.

5.3.1.3 Assemble the group of entrants at the gate.

5.3.1.3.1 All Primary Area entrants shall complete the “C-A RWP Access Control Log”

5.3.1.3.2 Entrant logs in on Gate Log Sheet

Note 6:

No more than six persons may enter: the RCT, the Shift Operations Group Member and four others (two groups of two persons per group).

5.3.1.4 The Shift Operations Group member shall verify that all who wish to enter have signed in on the Gate Security Log Sheet.

5.3.1.5 The Shift Operations Group member shall inform entrants that

5.3.1.5.1 THEY MUST NOT LEAVE THE ENCLOSURE without the shift operations person opening the gate, and without signing out on the gate log sheet which may remain at the gate, and

5.3.1.5.2 Entrants shall remain with their group and that the group shall travel as a unit for the purposes of safety.

5.3.2 Making the entry

5.3.2.1 The Shift Operations Group member un-resets the gate when given a simultaneous release from MCR.

5.3.2.2 The group enters in front of the Shift Operations Group member. No use of keys is required by entrants other than the Shift Operations Group member.

5.3.3 After entries are completed

5.3.3.1 Shift Operations Personnel shows the OC that the C-A Gate Security Log Sheet indicates that all persons that entered the enclosure have been accounted for.

5.3.3.1.1 OC reviews the log sheet and signs on the appropriate line that they have reviewed the sheet.

5.3.3.2 After the OC approves, reset the redundant reset as required.

5.3.3.3 File the completed C-A Gate Security Log Sheet in the "Gate Security Log" three ring binder in the MCR.

5.4 Restricted Access – Operations Coordinator Orders

5.4.1 Setting a PRIMARY beam enclosure to Restricted Access (RA)

5.4.1.1 Confirm The AGS and Booster is LOTO'ed according to [C-A OPM 2.6.1](#) before the RA state is selected.

5.4.1.2 Establish Controlled Access gate watch to allow RCT to perform a radiation survey before RA state is selected.

5.4.1.3 Have a RCT perform a cursory or detailed survey, as required, before setting an enclosure to RA.

5.4.1.3.1. The RCT survey may be waived if the conditions of paragraph 5.2.1.9.1.1 are met.

5.4.1.4 Follow the rules found in paragraph 5.1 to set an enclosure to RA.

5.4.1.5 After RCT approves, the OC or the Maintenance Coordinator, or their designee, shall instruct the operator to set the enclosure to RA.

5.4.2 All entrants to High Radiation Areas shall complete the "C-A RWP Access Control Log".

Note 7:

Persons having an AA256A key or Zero key (PASS) are trained and familiar with the hazards to be found in the enclosures, and may enter without escort.

5.5 Controlled Access to V Target Enclosure

Note 8:

V Target Enclosure may be entered in ONLY the Controlled Access (CA) or Safe Access (SA) states.

Note 9:

IF the V1 Primary zone (blockhouse) is swept AND you wish to maintain the "SWEEP GOOD", THEN simultaneous controlled access will be required at VPGE1 and VTGE1.

This may require a gate watch at both gates if RCA is not used for VPGE1. The OC shall decide which method to use.

Warning:

Treat the V Target Enclosure as a Contamination Area. Workers with valid Contamination Worker Training shall be allowed to enter and untrained workers shall be allowed to enter when escorted by a trained worker.

- 5.5.1 In the MCR select Controlled Access for V target and U Upstream, and U Downstream and V1 Primary on the Panel View.
- 5.5.2 Contact CAS and the RCT to meet at VPGE1 gate.
- 5.5.3 Team makes a controlled access through VPGE1 by following the Gate Entry instructions found in paragraph 5.2 above.
- 5.5.4 VTGE1 entrants prepare for access to a contaminated area.
- 5.5.5 CAS technician removes the padlock and closes the target shutter.
- 5.5.6 Gate watch allows entry to VTGE1 by following the Gate Entry instructions found in paragraph 5.2 above.
 - 5.5.6.1 IF the SWEEP is to be maintained, THEN the operator in the MCR shall hold the simultaneous release (gate open) button on the panel view until all workers have exited.
- 5.5.7 IF the sweep was lost in the V target enclosure, THEN it must be re swept in order to operate the C-A. Re-sweep V Target Enclosure according to the instructions in [C-A-OPM-ATT. 4.56.z](#) if the C-A is to be operated.
- 5.5.8 IF beam is to be brought to the V target, THEN have the CAS technician open the target shutter and padlock the controls.

5.5.9 IF required, re-sweep V1 Primary enclosure (Blockhouse) according to the instructions in [C-A-OPM-ATT. 4.56.aa.](#)

6. **Documentation**

6.1 C-A Gate Security Log Sheet. (See [C-A-OPM-ATT 4.1.a](#))

7. **References**

7.1 [C-A-OPM 4.44 "Operation of PASS".](#)

7.2 [C-A-OPM 4.30 "Operating Directive for Resetting a Primary Area Gate on Which One Reset Circuit Has Dropped Out".](#)

7.3 ESHS Manual Sections [1.5.0](#) and [1.5.1](#) regarding Lock and Tag rules.

7.4 [C-A-OPM 2.6.1, "Lockout/Tagout for the AGS and Booster Rings, During Accelerator Operations".](#)

7.5 [C-A-OPM 2.6.2 "Partial Lockout/Tagout for the AGS and Booster Rings During Accelerator Operations Under Controlled Access Conditions".](#)

7.6 [C-A-OPM 3.11, "Policy for Access to All Primary Beam Enclosures for Abnormal Situation Assessment".](#)

7.7 [C-A-OPM-ATT 9.5.11.a "C-A RWP Access Control Log".](#)

8. **Attachments**

8.1 [C-A-OPM-ATT 4.1.a, "C-A Gate Security Log Sheet Form".](#)

8.2 [C-A-OPM-ATT 4.1.b, "Primary Beam Accessibility Matrix".](#)

8.3 [C-A-OPM-ATT 4.1.c, "Keys Required to Access Primary Beam Enclosures".](#)

8.4 [C-A-OPM-ATT 4.1.d, "Access Control Flow Chart – Appendix".](#)

8.5 [C-A-OPM-ATT 4.1.e](#), Extracted from [C-A-OPM 2.6.2](#) Paragraph 3.4 "Electrical Safety Training Requirements for Ring Entry".

8.6 [C-A-OPM-ATT 4.1.f, "C-A Gate Security Log Sheet for Remote Access".](#)